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The Relationship Between Postoperative Pain Intensity and Sleep Quality in Patients After Spinal Anesthesia

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Abstract

Background: Postoperative pain in each patient will experience different pain from one another. Inadequate pain management can have a direct impact on postoperative pain, which is disruption of sleep quality. **Purpose:** The purpose of this research was to identify any correlation between the severity of postoperative pain and the quality of sleep experienced by patients after spinal anesthesia. **Methods:** This research employs a cross-sectional design based on quantitative correlation. Using a non-probability purposive sampling approach, 51 participants were surveyed after spinal anesthesia for this investigation. The data was collected in the inpatient room at Wijayakusuma Purwokerto Hospital using questionnaire sheets from the Pittsburgh Sleep Quality Index (PSQI) to assess sleep quality and NRS (Numeric Rating Scale) to quantify postoperative pain severity. The Spearman rank test was used to examine the data. **Results:** Forty-three people (78.4% of the total) reported minor postoperative discomfort, while forty-three people (84.3% of the total) reported satisfactory sleep quality. A correlation force of 0.756 and a p-value of 0.000 were determined using the Spearman rank test. **Conclusions:** Patients undergoing spinal anesthesia at Wijayakusuma Purwokerto Hospital reported significantly higher levels of postoperative discomfort and worse sleep quality.

Keywords: pain intensity; sleep quality; post-operative; spinal anesthesia

Introduction

Surgery or surgery is one of the invasive actions carried out by making an incision in a part of the body that is experiencing health problems, then taking corrective action which ends with closing the wound through the suturing process [1]. In its implementation, surgery requires anesthesia which aims to relieve surgical pain [2].

Anesthesia has 3 types, namely local anesthesia, regional anesthesia and general anesthesia. The anesthetic technique that is often used in lower extremity surgery is regional anesthesia with a spinal technique (Subarachnoid Block). Spinal anesthesia in the process of which local anesthetic drugs are injected into the subarachnoid space between the lumbar vertebrae 2-3, lumbar 3-4 or lumbar 4-5 [3]. The typical duration of spinal anesthetic treatments is around 4 to 6 hours, although this might vary depending on a number of circumstances. After 4 to 6 hours the analgesic effect of spinal anesthesia drugs begins to decrease so that patients will feel pain in the surgical wound. Post-anesthesia patients will experience pain even though pharmacological therapy has been given, especially during the interval of analgesic administration [4].

The complicated response of the Central Nervous System (CNS) to tissue stress causes postoperative pain [5]. The pain can be mild, moderate, or severe; however, as the body heals, the intensity of the pain may decrease. Delayed rehabilitation and prolonged hospitalization can be caused by uncontrolled patient pain [6].

Pain perception varies greatly in each individual, this can occur because pain is subjective [7]. Discomfort is a uniquely personal experience that no one else can understand. Pain can fill a person's entire mind, regulate his activities and change the person's life [8]. Pain management can be done for post-surgical pain management with pharmacological and non-pharmacological therapies [9,10]. The implementation of analgesic administration is most often given to patients who experience severe pain [1]. Therefore, adequate post-surgical pain treatment is very important [11]. Inadequate pain management can have effects on patients, such as sleep disturbances, difficulty mobilizing, anxiety and aggression [1]. Disruption of sleep quality with improper rapid eye movement (REM) and non-REM (nonrapid eye movement) periods is a direct result of the pain that will be experienced following surgery [12].

Sleep disruption is characterized by a lack of rejuvenation upon awakening or difficulty going asleep, even while the total amount of time spent sleeping is met. Sleep disorders can cause decreased pain tolerance due to increased fatigue in the sympathetic central nervous system which leads to increased analgesic use which contributes to the incidence of sleep disorders [13].

According to a study conducted by Budiyanto and Hamdiah (2022), a total of 12 participants (63.2%) reported excellent sleep quality while experiencing light pain, 17 participants (73.9%) reported moderate pain, and 15 participants (93.8%) reported severe pain while experiencing poor sleep quality. While one respondent (5.3%) had poor sleep quality and eighteen (94.7%) had excellent sleep quality out of nineteen respondents with moderate pain levels in the study by [14,15]

Data from the past three months with an average of 106 patients having spinal anaesthetic is available, according to a pre-survey done at RST Wijayakusuma Purwokerto on November 21, 2023. Supported by the results of an interview with one of the patients after spinal anesthesia surgery after 24 hours that there were complaints of mild pain after surgery.

Based on the description above, there has not been much research on the phenomenon that occurs and the information that has been obtained, The researcher is keen in delving into this phenomenon via study at RST Wijayakusuma Purwokerto, specifically looking for a correlation between the severity of postoperative pain and the quality of sleep experienced by patients after spinal anesthesia.

Methods

This study employs a cross-sectional design based on quantitative correlation. After spinal anesthesia, 51 participants were selected using a non-probabilistic purposive selection method for this investigation. Patients undergoing spinal anesthesia at RST Wijayakusuma Purwokerto after surgery made up the study's population. On a monthly basis, during August and October 2023, RST Wijayakusuma Purwokerto averaged 106 patients undergoing spinal anesthesia for surgical procedures. Using the numerical Rating Scale (NRS) and the Pittsburgh Sleep Quality Index (PSQI), data was collected from June 28 to July 13, 2024, in the Antasena and Gayatri rooms at RST Wijayakusuma Purwokerto to assess the

severity of postoperative pain and sleep quality, respectively. Applying the spearman rank test to the data. Approval number B.L.PPM-UHB/557/06/2024 it indicates that this study has been greenlit by the University of Harrogate's Research Ethics Committee.

Findings

Table 1: Characteristics of Respondents following Spinal Anesthesia at RST Wijayakusuma Purwokerto: Frequency Distribution

Characteristics	Frequency (n=51)	Percentage
Age		
18-30 years	18	35,3
31-40 years	9	17,6
41-50 years	9	17,6
51-60 years	11	21,6
> 60 years	4	7,8
Gender		
Male	22	43,1
Female	29	56,9

Table 1 shows the demographics of the 51 respondents, broken down by gender and age. Age characteristics show that at the age of 18-30 years as many as 18 respondents (35%), 31-40 years old as many as 9 respondents (17.6%), 41-50 years of age 9 respondents (17.6%), 51-60 years old as many as 11 respondents (21.6%), and at the age of >60 years as many as 4 respondents (7.8%). Whereas in gender characteristics in women as many as 29 respondents (56.9%) and in men as many as 22 respondents (43.2%).

Table 2. Distribution of Postoperative Pain Intensity in Patients at RST Wijayakusuma Purwokerto Following Spinal Anesthesia

Pain instensity	Frequency (n=51)	Percentage (100%)
No pain (0)	3	5,9
Mild pain (1-3)	40	78,4
Moderate pain (4-6)	8	15,7
Severe pain (7-10)	0	0

According to Table 2, out of 51 respondents, 3 (or 5.9%) reported no pain at all, 40 (or 78.4%) reported mild pain, 8 (15.7%) reported moderate pain, and 0 (or 0%) reported severe pain after the operation.

Table 3. Data from patients undergoing spinal anesthesia at RST Wijayakusuma Purwokerto on the frequency distribution of sleep quality

Sleep Quality	Frequency (n=51)	Percentage (100%)
Good sleep quality	43	84,3
Poor sleep quality	8	15,7

According to Table 3, which displays the findings of the frequency distribution of sleep quality, 44 respondents (84.3%) had excellent sleep quality, whereas 8 respondents (15.7%) had poor sleep quality.

Table 4. Relationship between Postoperative Pain Intensity and Sleep Quality in Patients After Spinal Anesthesia at RST Wijayakusuma Purwokerto.

Pain Intensity	Sleep Quality						*p-value*	*r*
	Good		Bad		Total			
	n	%	n	%	n	%		
No pain (0)	3	5,9	0	0,0	3	5,9		
Mild pain (1-3)	39	76,5	1	2,0	40	78,4		
Moderate pain (4-6)	1	2,0	7	13,7	8	15,7		
Severe pain	0	0	0	0	0	0		

(7-10)

Total	**43**	**84,3**	**8**	**15,7**	**51**	**100**

According to Table 4, the number of respondents who reported no discomfort while sleeping is 5.9%, and there was not a single respondent who reported poor sleep quality. With mild discomfort, 36 people (76.5%) reported poor sleep quality, while 1 person (2.0%) reported poor sleep quality. One respondent (2.0%) reported excellent sleep quality while suffering moderate discomfort, whereas seven (13.7%) reported poor sleep quality.

Discussions

According to table 1 the majority of patients in this research who had spinal anesthesia for surgery were between the ages of 18 and 30, comprising 18 respondents or 35.5% of the total. This is in line with Sugathot and Utami's research (2018) which says age is an important variable that affects pain, especially in children and the elderly. Adults will experience neurophysiological changes and may experience a decrease in sensory stimulus perception and an increase in pain threshold. The increasing age, the higher the pain reaction and response felt [16]. Based on the characteristics of gender in this study, the majority occurred in women as many as 29 respondents (56.9%). This is due to the fact that women are more susceptible to intense pain than men because of their lower pain tolerance. This is caused by biological factors and psychological factors that have a role in influencing differences in pain perception between the sexes [17].

According to the data in table 2, the majority of respondents (78.4%) reported only slight discomfort after the operation. Consistent with previous studies, this one describes the level of pain that patients felt following lower abdominal surgery at Sanglah General Hospital. Wiguna et al. (2021) found that 71 out of 100 patients reported mild pain as their postoperative pain intensified. Increased pain can be influenced by the amount of surgery undergone. Postoperative pain appears due to mechanical stimulation of the wound which causes the body to produce chemical mediators of pain. The intensity of pain felt by patients varies greatly from mild pain to severe pain, this will decrease as recovery time progresses [5].

Table 3 displays the findings for sleep quality, which indicate that the majority of respondents (84.3% or 43 people) had satisfactory sleep. In a study by Sari et al. (2022), researchers looked at the correlation between postpartum pain and sleep quality in women who had cesarean sections. The majority of the participants (22 out of 33) reported good sleep quality, which is consistent with our findings. In some diseases, pain forces patients to fall asleep in unusual positions. In addition, there are several factors that can affect sleep such as disease, environment, stress, stimulants that cause someone to have trouble sleeping [18].

Based on the observations of researchers in several fracture cases, patients are required to use casts, which can affect pain intensity when performing early mobilization and interfere with comfort during sleep. Likewise, the environment and lighting factors that each individual has different comfort. Health status both physiological health conditions and psychological health greatly affects their sleep needs [19]. Sleep quality can be said to play a role in the post-surgical recovery process [20–23]. A good night's sleep is one in which a person does not wake feeling drowsy or otherwise disturbed. Difficulty maintaining a steady state of mind and body could result from poor quality sleep [24].

The data shown above indicates a substantial association (correlation) between the variable postoperative pain

intensity and sleep quality in patients following spinal anesthesia, with a correlation value of 0.756**. At the 0.01% level of significance, the association is indicated with an asterisk (**). The findings show a positive correlation value of 0.756, indicating a unidirectional association between the two variables. This suggests that a greater severity of postoperative pain is associated with lower sleep quality [25–27]. According to the results shown earlier, a significant relationship (mean) exists between the variable post-surgical pain intensity and sleep quality in patients following spinal anesthesia, as indicated by the Sig. (2-tailed) value of 0.000, which is less than 0.05 or 0.01.

This study confirms the findings of regarding the correlation between postoperative pain, anxiety, and sleep quality in the operating room. The results show that postoperative pain significantly affects sleep quality in patients at Budi Asih Hospital in Serang City in 2021 (p-value 0.001). Researchers assume that postoperative patients after 24 hours perceive pain from no pain to moderate pain. No pain to mild pain can be influenced by the type of surgery such as ROI (Remove of Implant), Up K-wires, nail extraction, vulvar biopsy and other minor surgeries, while moderate pain is influenced by the type of major surgery such as ORIF (Open reduction and internal fixation), hysterectomy, laparatomy, amputation and others [28–30].

The use of drugs as a way to reduce pain is the last alternative if the pain becomes increasingly severe, the patient can no longer bear the pain or the pain lasts for a long time [19]. Actual and prospective tissue damage causes patients to endure pain, which is an unpleasant sensory and emotional experience [5]. Postoperative pain can affect sleep quality, but in some people, pain does not affect sleep quality due to the different perceptions of each patient and the level of need for sleep that varies with each individual [31]. Pain is one of the things that might disrupt a good night's sleep. Insomnia may be brought on by physical ailments [18].

Therefore, the role of medical personnel and the environment is very influential on patient comfort during the post-surgical recovery period in the hospital. Various efforts that can be made such as relaxation techniques, distraction, listening to music, and distractions that focus on feeling pain will help patients to relieve pain. During this time, pharmacological therapy is still given as a collaborative measure that can create a sense of comfort in post-surgical patients.

Limitations Research

Based on the researcher's experience in this research process, the limitations experienced are as follows: There is a combination in the delivery of the Numeric Rating Scale (NRS) with the delivery of the Verbal Rating Scale (VRS) where it is more dominant to use the NRS delivery, so that there are two different views. In the standard Pittsburgh Sleep Quality Index (PSQI) questionnaire there are differences in time, so it must be adopted and readjusted to the needs of the study. Researchers did not include the characteristics of the type of surgery, where these characteristics play a major role in the results of this study. Researchers did not look in detail regarding the pharmacological therapy that had been given according to the doctor's instructions, which could affect the intensity of the pain.

Conclusion

Understudy findings of RST Wijayakusuma Purwokerto, it could be concluded that most respondents who had spinal anesthesia after surgery experienced mild to moderate postoperative pain and reported good sleep quality in general.

Moreover, there was a significant relationship between postoperative pain intensity and sleep quality; it shows that those with lower pain levels experienced better sleep quality. This emphasizes the importance of good postoperative pain management in recovery, such as improving sleep quality in patients following spinal anesthesia.

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Conflict of Interest Statement
The authors have confirmed that they have no competing interests.

Data Availability
The datasets used or generated in this study are available from the corresponding author upon reasonable request.

Author Contributions
Shelina: Conception and design of the study, Search Data Base, Methodology, Analysis Risk of Bias, Data Analysis and Interpretation, Writing, Review, and Editing. **Amin Susanto:** Study conception and design, search database, methodology, data analysis, and interpretation, and writing, review, and editing. **Septian Mixrova Sebayang**Conception and design of the study, Search Database, Methodology, Data Analysis, and Interpretation, Writing, Review, and Editing.

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